WHAT IS CLAIMED IS:

1.   A method for pre-coding in a communication system, comprising:

2   determining pre-coder parameters;

          pre-coding first data in accordance with said determined pre-coder

4   parameters;

          transmitting said pre-coded first data; and

6   transmitting non pre-coded first reference data.

2.   The method as claimed in claim 1 wherein determining a pre-

2   coder parameters comprises:

          receiving a reference data; and

4   determining the pre-coder parameters in accordance with said received

reference data and the reference data.

3.   The method as claimed in claim 1 wherein determining a pre-

2   coder parameters comprises:

          receiving the non pre-coded first reference data;

4   determining the pre-coder parameters in accordance with said received

non pre-coded first reference data and the first reference data; and

6   transmitting said determined pre-coder parameters.

4.   The method as claimed in claim 3 further comprising:

2   receiving said determined pre-coder parameters; and

          providing said determined pre-coder parameters to the pre-coder.

5.   The method as claimed in claim 1 wherein pre-coding first data in

2   accordance with said determined parameters comprises:

          pre-coding a payload data; and

4   pre-coding a dedicated pilot data.

6.   The method of claim 1 wherein said transmitting a non pre-coded

2   reference data comprises:

          transmitting a continuous non pre-coded reference data.

7.   The method of claim 1 wherein said transmitting a non pre-coded

2   reference data comprises:

transmitting a discontinuous non pre-coded reference data.

8.   The method of claim 1 wherein said transmitting a non pre-coded

2   reference data comprises:

transmitting a pilot data.

9.   The method as claimed in claim 1, further comprising:

2   receiving the non pre-coded first reference data at least two antennae;

equalizing each of said received non pre-coded first reference data by an

4   equalizer and provide equalized non pre-coded first reference data;

determining the pre-coder parameters by adjusting characteristics of the

6   at least two equalizers in accordance with the received non pre-coded first

reference data and the first reference data; and

8   transmitting said determined pre-coder parameters.

10.   The method as claimed in claim 9 wherein said determining the

2   pre-coder parameters by adjusting characteristics of the at least two equalizers in

accordance with the received non pre-coded first reference data and the first

4   reference data comprises:

optimizing a quality metric of a composite data comprising the equalized

6   non pre-coded first reference data.

11.   A method for demodulating pre-coded data, comprising:

2   receiving a reference data and a pre-coded data; and

determining demodulator parameters in accordance with the said

4   received reference data and the reference data; and

demodulating the pre-coded data in accordance with said determined

6   demodulator parameters.

12.   The method as claimed in claim 11 wherein the reference data

2   comprise a non pre-coded pilot signal.

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13.   The method as claimed in claim 11 wherein the reference data

2   comprise a pre-coded pilot signal.

14.   The method as claimed in claim 11 wherein the reference data are

2   continuous reference data.

15.   The method as claimed in claim 11 wherein the reference data are

2   discontinuous reference data.

16.   An apparatus for pre-coding in a communication system,

2   comprising:

a pre-coder configured to pre-code data in accordance with pre-coder

4   parameters; and

a first transmitter communicatively coupled to said pre-coder configured

6   to:

transmit the pre-coded data; and

8   transmit a non pre-coded first reference data.

17.   The apparatus as claimed in claim 16, further comprising:

2   a first receiver communicatively coupled to said pre-coder configured to

receive a reference data;

4   a first processor communicatively coupled to said first receiver; and

a storage medium communicatively coupled to said first processor and

6   containing a set of instructions executable by the processor to:

determine the pre-coder parameters in accordance with said

8   received reference data and the reference data.

18.   The apparatus as claimed in claim 16, further comprising:

2   a second receiver configured to receive the non pre-coded first reference

data;

4   a second processor communicatively coupled to said second receiver;

a storage medium communicatively coupled to said first processor and

6   containing a set of instructions executable by the processor to:

8   determine the pre-coder parameters in accordance with said received non pre-coded first reference data and the non pre-coded first reference data; and

10   a second transmitter communicatively coupled to said second processor configured to transmitting said determined pre-coder parameters.

19.   The apparatus as claimed in claim 18, wherein said first receiver

2   is further configured to:

receive said determined pre-coder parameters; and

4   provide said received pre-coder parameters to said pre-coder.

20.   The apparatus as claimed in claim 16 wherein said pre-coder is

2   further configured to pre-code a second reference data in accordance with the determined parameters; and

4   wherein said first transmitter is further configured to transmit the pre-coded second reference data.

21.   The apparatus as claimed in claim 16 wherein said first transmitter

2   is further configured to transmit the non pre-coded first reference data continuously.

22.   The apparatus as claimed in claim 16 wherein said first transmitter

2   is further configured to transmit the non pre-coded first reference data discontinuously.

23.   The apparatus of claim 16 wherein said non pre-coded first

2   reference data comprise a pilot data.

24.   The apparatus as claimed in claim 20 wherein said first transmitter

2   is further configured to transmit the pre-coded second reference data continuously.

25.   The apparatus as claimed in claim 20 wherein said first transmitter

2   is further configured to transmit the pre-coded second reference data discontinuously.

26.   The apparatus of claim 20 wherein said pre-coded second

2   reference data comprise a dedicated pilot data.

27.   The apparatus as claimed in claim 16, further comprising:

2   at least two equalizers configured to accept the received non pre-coded

first reference data and provide equalized non pre-coded first reference data; .

4   a processor communicatively coupled to said at least two equalizers;

        a storage medium communicatively coupled to the processor and

6   containing a set of instructions executable by the processor to determine said

pre-coder parameters by adjusting characteristics of the at least two equalizers

8   in accordance with the received non pre-coded first reference data and the first

reference data; and

10   a second transmitter communicatively coupled to said processor

configured to transmit the determined pre-coder parameters.

28.   The apparatus as claimed in claim 16 wherein said processor

2   determines said pre-coder characteristics by adjusting characteristics of the at

least two equalizers in accordance with the non pre-coded first reference data

4   the first reference data by executing a set of instructions to:

        optimize a quality metric of a composite data comprising the equalized

6   non pre-coded first reference data.

29.   An apparatus for demodulating pre-coded data, comprising:

2   a first receiver configured to:

        receive a reference data and a pre-coded data; and

4   determine demodulator parameters in accordance with the said

received reference data and the reference data; and

6   a demodulator communicatively coupled to said receiver configured to

demodulate the pre-coded data in accordance with said determined

8   demodulator parameters.

30.   The apparatus as claimed in claim 29 wherein the reference data

2   comprise a non pre-coded pilot signal.

31.   The apparatus as claimed in claim 29 wherein the reference data

2   comprise a pre-coded pilot signal.

32.   The apparatus as claimed in claim 29 wherein the reference data

2   are continuous reference data.

33.   The apparatus as claimed in claim 29 wherein the reference data

2   are discontinuous reference data.

34.   A digital signal processing apparatus for pre-coding in a

2   communication system, comprising:

        memory storage unit; and

4   a digital signal processor communicatively coupled to said memory

storage unit, and capable of executing instructions to:

6   determine pre-coder parameters;

        pre-code first data in accordance with the determined pre-coder

8   parameters; and

        assist in preparing the pre-coded first data and non pre-coded first

10   reference data for transmission.

35.   A digital signal processing apparatus for demodulating pre-coded

2   data in a communication system, comprising:

        memory storage unit; and

4   a digital signal processor communicatively coupled to said memory

storage unit, and capable of executing instructions to:

6   accept a reference data and a pre-coded data;

        determine demodulating parameters in accordance with the accepted

8   reference data and the reference data; and

        demodulate the pre-coded data in accordance with the determined

10   demodulating parameters.

36.   An apparatus for pre-coding in a communication system,

2   comprising:

        means for determining a pre-coder parameters;

4 means for pre-coding first data in accordance with said determined precoder parameters;

6 means for transmitting said pre-coded first data and a non pre-coded first reference data.

 37. An apparatus for demodulating pre-coded data, comprising:

2 means for receiving a reference data and a pre-coded data; and

  means for determining demodulator parameters in accordance with the

4 said received reference data and the reference data; and

  means for demodulating the pre-coded data in accordance with said

6 determined demodulator parameters.